5559.43
2

MINES DEPT.
VICTORIA

Queensland.

DEPARTMENT OF MINES.

Queensland Geological Survey.

(B. DUNSTAN, CHIEF GOVERNMENT GEOLOGIST.)

PUBLICATION No. 259.

Mesozoic Floras of Queensland

Part I.—concluded.

The Flora of the Ipswich and Walloon Series.

(d.) Ginkgoales, (e.) Cycadophyta, (f.) Coniferales.

By A. B. WALKOM, B.Sc.,

Assistant Lecturer in Geology, The University of Queensland,
Honorary Palæontologist to the Queensland Museum.

WITH 9 PLATES.

BRISBANE.

BY AUTHORITY: ANTHONY JAMES CUMMING, GOVERNMENT PRINTER.

1917.

Queensland.

DEPARTMENT OF MINES.

Queensland Geological Survey.

(B. Dunstan, Chief Government Geologist.)

PUBLICATION No. 259.

Mesozoic Floras of Queensland

Part I.—concluded.

The Flora of the Ipswich and Walloon Series.

(d.) Ginkgoales, (e.) Cycadophyta, (f.) Coniferales.

By A. B. WALKOM, B.Sc.,

Assistant Lecturer in Geology, The University of Queensland,
Honorary Palæontologist to the Queensland Museum.

WITH 9 PLATES.

BRISBANE.

BY AUTHORITY : ANTHONY JAMES CUMMING, GOVERNMENT PRINTER.

1917.

MINES DEPT. No 9 BRANCH VICTORIA

AUTHOR'S PREFACE.

The present contribution completes the examination of that section of the Mesozoic fossil plants forming the flora of the Ipswich and Walloon Series. A few specimens still remain undescribed; some of these have been obtained after the completion of the section of the work dealing with them, and the description of others has for various reasons been delayed, and it is hoped that at some future date these will be described with any further specimens which may be obtained.

In my account of *Tæniopteris* given in Publication 257 of the Queensland Geological Survey, reference was omitted to some remarks on the Victorian species by Mr. F. Chapman in a Report on Jurassic Plants published in the Records of the Geological Survey of Victoria (vol. 2, pt. 4, p. 215). Chapman there regards *T. spatulata*, McClelland, as a central type, variations in two directions ranging to the form known as *T. Daintreei* on the one hand and *T. Carruthersi* on the other. To these two he gives varietal names *T. spatulata* var. *Carruthersi* and *T. spatulata* var. *Daintreei*.

As the result of my examination of the Queensland collections[1] I unite *T. Daintreei* with *T. spatulata*, and regard *T. Carruthersi* as a distinct species. The latter species occurs in the Ipswich Series and only occasionally in the Walloon Series, while *T. spatulata* (=*T. Daintreei*) does not occur in the Ipswich Series, but only in the Walloon Series.

The example figured by Chapman from Park Cutting, near Brisbane, as *T. spatulata*, McClelland,[2] shows the secondary veins making an acute angle with the midrib and appears to be referable to *T. Tenison-Woodsi*.

Brisbane, 17th April, 1917.

---

[1] Q'land Geol. Surv., Pub. 257.

[2] Chapman (08), t. 36, fig. 2.

CONTENTS.

GINKGOALES. Page.

Ginkgo 7
G. antarctica, Saporta 7
G. digitata (Brongniart) 8
G. cf. magnifolia, Fontaine 9
G. phœniciformis, Shirley 9
Baiera 10
B. Simmondsi (Shirley) 10
B. bidens (Tenison-Woods) 11
B. ipsviciensis, Shirley 11
B. ginkgoides, Shirley 12

? GINKGOALES.

Stachyopitys annularioides, Shirley 13
Stachyopitys Simmondsi, Shirley 13

CYCADOPHYTA.

BENNETTITALES—

Bennettites (*Williamsonia*) sp. 14
Ptilophyllum (*Williamsonia*) *pecten*, (Phillips) 14

CYCADOPHYTA INCERTÆ SEDIS—

Pterophyllum 15
P. abnorme, Etheridge Jr. 16
P. contiguum, Schenk 16
P. multilineatum, Shirley 17
P. Nathorsti (Seward) 18
P. parvum, Shirley 19
Pseudoctenis 19
P. eathiensis (Richards) 19
Podozamites lanceolatus, L. and H. 20
Podozamites sp. 20
Otozamites 20
O. queenslandi, Walkom 21
O. obtusus, L. and H. 21
O. Feistmanteli, Zigno 22
O. cf. Mandelslohi, Kurr 23

CONIFERALES.

Araucarites polycarpa, Tenison-Woods 24
Brachyphyllum crassum, Tenison-Woods 25
Taxites planus, Feistmantel 25

GYMNOSPERMOUS SEEDS 26

PLANTA INCERTÆ SEDIS.

Phœnicopsis elongatus (Morris) 27

CONCLUSION 28

BIBLIOGRAPHY 29

EXPLANATION OF PLATES 31

THE FLORA OF THE IPSWICH AND WALLOON SERIES—concluded.

By A. B. Walkom, B.Sc.

DESCRIPTION OF SPECIMENS.

GINKGOALES.

Fossil leaves belonging to this class are abundant in the Lower Mesozoic Rocks of Queensland. Associated with these leaves at Denmark Hill, Ipswich, there are numerous seed-like bodies which in all probability belonged to the same plants.

Some of these seeds resemble in a general way specimens to which the name *Beania gracilis* has been applied. Others bear a resemblance to the female seeds of *Ginkgo*. The examination of these seeds is not at present completed, but a preliminary account is given of them, and a few of them figured (see p. 26).

There is no distinct line of demarcation between the genera *Ginkgo* and *Baiera*; the latter name is usually applied to those forms having the leaves deeply divided into narrow, linear segments. This distinction is, of course, artificial, but it distinguishes between leaves of two distinct types, and since there is only small chance of finding the leaves of these plants in actual connection with the reproductive organs, a useful purpose is served in keeping the two types distinct.

GINKGO.

The great amount of variation in leaves from a single plant of the recent species *G. biloba* points to the probability of similar variation in fossil leaves of this genus. In dealing with the fossils, therefore, allowance must be made for this variation, and there will always be difficulty in defining the limits of species. The tendency will be towards the establishment of more species than necessary.

GINKGO ANTARCTICA, Saporta.

(Plate 1, figs. 1, 2.)

1885. *Salisburia antarctica*, Renault, Cours de botanique fossile, vol. 4, p. 57, t. 2, fig. 19.

1898. *Ginkgo antarctica*, Shirley, Q'land Geol. Survey, Bull. 7, p. 11, t. 1, fig. 1.

Leaf simple, fanshaped, with a short slender petiole. The petiole is striated longitudinally and up to 1·5 mm. wide at base of the leaf. The leaf reaches a length up to 3 cm. from petiole to outer margin, and the margins make obtuse angles with the petiole.

The veins are numerous, radially disposed and repeatedly dichotomous ; in the lower part of the leaf they are about 1 mm. apart, and there are about 12 in 5 mm. at the margin.

This is a distinct form of leaf and no difficulty can be experienced in recognising examples of the species.

Renault[3] figured a specimen from New South Wales, but gave no further detail as to locality.

Locality :—(*Ipswich Series*) : Denmark Hill, Ipswich (F 111).

Figured specimen : The original of Plate 1, fig. 1, is specimen F 111 in the collection of the Queensland Geological Survey.

Ginkgo digitata (Brongniart).

(Plate 1, figs. 3, 4, 5.)

For full synonymy, *see* Seward (00), p. 254.

1900. *Ginkgo digitata*, Seward, Jurassic Flora, vol. 1, p. 254.

The specimen figured on Plate 1, fig. 4, is very similar to specimens figured from time to time as *Ginkgo Huttoni* (Sternberg). In 1900 Seward[4] included this species as a synonym of G. *digitata* (Brongniart), on account of the marked variation in leaf-form of the recent species *G. biloba*. This great variation must be remembered in dealing with the fossils, otherwise the tendency will be to unduly increase the number of species of *Ginkgo*, and thus exaggerate its importance in a flora. In the same work Seward suggests retaining the term *Huttoni* as a varietal name for the more deeply-lobed examples of *G. digitata*.

The specimens mostly have lanceolate segments, varying in length from about 3·5 cm. to 8 cm. on the one leaf, the outer ones being the shorter and the central ones longer ; they are about 8 mm. wide at the widest part and there are as many as 10 segments in a leaf. The veins are dichotomous, usually dividing twice, and there are about 10 veins at the widest part of a segment.

The specimen figured by Shirley as *Ginkgo sp.*[5] may be an example of *G. digitata* in which the leaf is not deeply divided, similar to that figured by Seward from the Inferior Oolite of Yorkshire.[6]

---

[3] Renault (85), t. 2, fig. 19.
[4] Seward (00), p. 254.
[5] Shirley (98*a*), t. 5.
[6] Seward (00*a*), t. 2, fig. 5.

Localities :—(*Ipswich Series*) : Denmark Hill, Ipswich (F 104), Yeronga (F 109), Campbell's Quarry, Albion (1415).[6a]

Figured specimens : The originals of Plate 1, figs. 3 and 4, are specimens F 116 in the Queensland Geological Survey collection and 1415 in the collection of the University of Queensland.

Ginkgo cf. magnifolia, Fontaine.

(Plate 4, figs. 3, 4.)

1905. *Ginkgo Huttoni magnifolia*, Fontaine in Ward, U.S.G.S., Mon. 48, p. 124, t. 31, fig. 8.

Under this name are included some larger specimens which resemble somewhat Fontaine's *G. Huttoni magnifolia*.[7]

The leaf is large, divided into a few wedge-shaped segments (usually two or four) which are about 7 cm. from base to outer margin. The petiole is about 3·5 mm. wide just below the leaf. The veins divide dichotomously and are about 1 mm. apart.

Fontaine retains *G. Huttoni* as a species separate from *G. digitata* and remarks that his variety *magnifolia* only differs from other examples of *G. Huttoni* in size.[8] Knowlton,[9] however, includes both *G. Huttoni* and *G. Huttoni* var. *magnifolia* under *G. digitata*.

The specimens described here differ most from the variety mentioned in the large wedge-shaped segments, and it does not seem reasonable to include them in *G. digitata*, even allowing that species a very wide variation. There is a general resemblance in size and in the character of the venation with *Baiera stormbergensis* from the Stormberg Series of South Africa.[10]

Localities :—(*Ipswich Series*) : Denmark Hill (F 751), Yeronga (F 110) ; (*Walloon Series*) : Road between portions 155 and 157, Parish Biarra (1418).

Figured specimen : The original of Plate 4, fig. 3, is specimen 1418 in the collection of the University of Queensland.

Ginkgo phœniciformis, Shirley.

Ginkgo phœniciformis, Shirley[11], is a small fragment which cannot be placed specifically with any degree of accuracy.

[6a] Specimens numbered thus (F 104) are in the Geological Survey Collection ; those without prefix, thus (1415), are in the University of Queensland Collection ; and those with prefix S (S 67) are in the "Simmonds" Collection.

[7] Fontaine in Ward (05), p. 124, t. 31, fig. 8.

[8] Op. cit.

[9] Knowlton (14), p. 55.

[10] Seward (03), p. 64, t. 8, fig. 3.

[11] Shirley (98), p. 12, t. 1, fig. 2.

BAIERA.

The generic name *Baiera* is here used for leaves similar in general form to those of *Ginkgo*, but deeply divided into long, narrow, linear segments.

Baiera Simmondsi (Shirley).

(Plate 2.)

1886. *Jeanpaulia palmata*, Ratte, P.L.S.N.S.W., 1, p. 1078.
1887. *Salisburia palmata*, Ratte, P.L.S.N.S.W., 2, p. 137, t. 17.
1898. *Ginkgo Simmondsi*, Shirley, Qld. Geol. Surv., Bull. 7, p. 12, t. 2.

Leaf large, divided into numerous segments which are separate to the base. There are up to 9 segments near the petiole, and these divide dichotomously once, twice, or occasionally a third time, producing a large number of ultimate segments, which are about 5 mm. broad. The segments are long and narrow and gradually broaden away from the petiole; they reach a total length up to 15 cm. from the top of the petiole. The veins are fine and numerous and divide dichotomously; they average about 3 veins per mm. of breadth. The petiole is comparatively slender for the size of the leaf, being about 4 mm. broad at the top and narrowing slightly away from the leaf; none of the specimens show its full length, but in the most complete it is 6 cm. long.

The species is quite common at Denmark Hill, Ipswich. It has been suggested both by Arber[12] and Seward[13] that it is identical with *Baiera multifida*, Fontaine.[14] It differs, however, from Fontaine's figures of that species a good deal in general appearance; in addition, the segments are not so strap-shaped as in *B. multifida*. It seems to me that *B. multifida* resembles more closely *B. ipsviciensis* from the Queensland strata than it does *B. Simmondsi*.

There is no doubt that the present species should be referred to *Baiera* rather than to *Ginkgo*. Arber[15] has pointed out that Ratte's name *palmata* had already been adopted by Heer for a fossil of this genus from the Jurassic of Siberia.

Localities :—(*Ipswich Series*) : Denmark Hill (F 104*b*); Queensport ? (F 568); (*Walloon Series*) : Coal Ck., near Esk (F 101).

Figured specimen : The original of Plate 2 is specimen S 1 in the Simmonds Collection.

---

[12] Arber (02), p. 4.
[13] Seward (04*a*), p. 179.
[14] Fontaine (83), p. 87, t. 45, fig. 3; t. 46, figs. 1-3; t. 47, figs. 1, 2.
[15] Arber (02), p. 4.

Baiera bidens (Tenison-Woods).

(Plate 3, figs. 1, 2.)

1883. *Jeanpaulia bidens*, Tenison-Woods, P.L.S.N.S.W., 8, p. 132, t. 4, fig. 3.

1898. *Ginkgo bidens*, Shirley, Proc. Roy. Soc. Qld., 12, p. 74, t. 6.

1898. *Ginkgo bidens*, Shirley, Qld. Geol. Surv., Bull. 7, p. 12, t. 19, fig. 1; t. 21.

Leaf stalked, lamina fan-shaped, divided into a number of long narrow segments which are somewhat acutely pointed. These segments are up to 12 cm. long and 4 mm. wide; they are traversed by a few dichotomously-branching veins which are nearly 1 mm. apart; there are usually 3 to 8 veins in a single segment.

The petiole is finely striated, narrow and slender, being up to 10 cm. long and only 2 mm. broad.

Some specimens show a resemblance to *G. sibirica* from the Jurassic of Oregon.[16]

Baiera australis, Seward,[17] from the Jurassic of Victoria is another species of similar form.

This species is similar to some figures of *B. gracilis*, Bunbury, as noted by Seward,[18] and there is a possibility of the two being identical.

Isolated segments are very similar to the segments of *B. ginkgoides*, but the two species are quite distinct in the lower portion of the leaf, and in the manner of division of the leaf.

Localities :—(*Ipswich Series*) : Denmark Hill (F 104*a*); Yeronga (F 100).

Figured specimen : The original of Plate 3, fig. 1, is specimen 1411 in the collection of the University of Queensland.

Baiera ipsviciensis, Shirley.

(Plate 4, figs. 1, 2.)

1898. *Baiera ipsviciensis*, Shirley, Qld. Geol. Surv., Bull. 7, p. 12, t. 3, fig. 2.

Leaf with two branches from the top of the petiole. The branches divide dichotomously, usually about three times; the

[16] Ward (05), t. 32, fig. 3.

[17] Seward (04*a*), p. 177, figs. 36, 37.

[18] Seward (04*a*), p. 179.

segments are linear, strap-shaped, with bluntly rounded ends. The veins are parallel, branching dichotomously at long intervals, fine, about 12 in a space of 5 mm. The ultimate segments are 3 to 5 mm. wide, and the total length from the top of the petiole is about 7 cm.

This species is very similar to Fontaine's *B. multifida*,[19] a widespread type and may be identical with it. It is quite distinct in appearance from any of the other Queensland species.

Locality :—(*Ipswich Series*) : Denmark Hill (F 102).

Figured specimen : The original of Plate 4, fig. 1, is specimen F 102 in the collection of the Queensland Geological Survey.

Baiera ginkgoides, Shirley.

(Plate 3, figs. 3, 4.)

1898. *Baiera ginkgoides*, Shirley, Qld. Geol. Surv., Bull. 7, p. 13, t. 3, fig. 1.

Leaf divided into a small number of segments, widely separated. The petiole is about 1·5 mm. wide and striated longitudinally. The leaf divides dichotomously at the top of the petiole and each branch further divides dichotomously once or twice, producing usually up to 8 ultimate segments. The segments attain a length of at least 6·5 cm. from the top of the petiole to the outer margin, and the ultimate segments are about 8 mm. in width. The veins are few in number in each segment, and are about 1 mm. apart ; they branch dichotomously at long intervals. The apices of the segments are not preserved in any of the specimens.

This appears to be quite a distinct species, differing from others in the small number of segments, and the widely spread veins. Single segments are very similar to those of *Baiera bidens* but the lower part of the leaf is quite distinct as shown by the figures of the two species ; they are also distinct in the division of the leaf. The species is distinct in appearance from any figured in literature available to me.

Locality :—(*Ipswich Series*) : Denmark Hill, Ipswich (F 104*c*).

Figured specimen : The original of Plate 3, fig. 3, is specimen F 104*c* in the collection of the Queensland Geological Survey.

[19] Fontaine (83), p. 87, t. 45-47.

? GINKGOALES.

Stachyopitys annularioides, Shirley.

(Plate 4, fig. 6.)

1898. *Stachyopitys annularioides*, Shirley, Qland. Geol. Surv., Bull. 7, p. 13, t. 17, fig. 1.

The specimens described by Shirley under this name have an axis bearing lateral branches which terminate in a cluster of obovate bodies, apparently arranged in a whorl. These bodies are up to about 2·5 mm. in length and are somewhat obtusely pointed, and ·5 to ·75 mm. wide. They are striated longitudinally and there are about 12 of them in a cluster.

They are similar to specimens described from the Stormberg beds of South Africa by Seward[20] as *Stachyopitys* sp. and compared there with *Sphenolepis rhætica*, Geinitz. Nothing can be added here to Seward's discussion of the position of these fossils.

I have been unable to find the bract-like ginkgoid leaflets mentioned by Shirley.

Locality :—(*Ipswich Series*) : Denmark Hill, Ipswich (F 142); Nundah (F 15/954).

Figured specimen: The original of Plate 4, fig. 6, is specimen F 15/954 in the Queensland Museum collection.

Stachyopitys Simmondsi, Shirley.

1898. *Stachyopitys Simmondsi*, Shirley, Qland. Geol. Surv., Bull. 7, p. 13, t. 17, fig. 2.

This species is based on a specimen of similar general character to *Stachyopitys annularioides*, Shirley. It is a much smaller variety and may conveniently be retained for the present as a distinct species. The small obovate bodies are much rounder than in *S. annularioides*, being 1 to 1·5 mm. long and about ·75 mm. wide; there are also less of them in a cluster, being not more than six.

Locality :—(*Ipswich Series*) : Denmark Hill, Ipswich (F 256).

---

[20] Seward (03), p. 66.

CYCADOPHYTA.

BENNETTITALES.

Bennettites (Williamsonia) sp.

(Plate 4, fig. 5.)

Specimens which can definitely be classed as members of the Bennettitales are comparatively rare in the Queensland Lower Mesozoic Rocks. Two specimens from the Ipswich Series at Denmark Hill, of which one is figured on Plate 4, fig. 5, afford a very close comparison with figures of expanded bracts of *Bennettites* from other parts of the world.

These specimens show expanded linear bracts, ten in number, which are in a close spiral, and do not form a true whorl. The bracts are about 3 cm. long and 1 to 1·2 cm. wide, and are rather obtusely pointed. Some of them show a small number of veins parallel to the length and about 1 mm. apart.

The specimens are of the same general character as *Bennettites* (*Williamsonia*) *Carruthersi*, Seward,[21] from the Wealden Flora of England ; also to specimens figured from the flora of the Mixteca Alta in Mexico by Wieland as *Williamsonia Tlazolteotl*[22] and *W. Huitzilopochtli*.[23]

Similar specimens have also been figured from India by Feistmantel from the Jurassic flora of Kach.[24]

The present specimens are not sufficiently distinctive to be worthy of a new specific name, and it seems better to leave them without such until further information is available.

Locality :—(*Ipswich Series*) : Denmark Hill, Ipswich (S 67).

Figured specimen : The original of Plate 4, fig. 5, is specimen S 67 in the " Simmonds " Collection in the University of Queensland.

Ptilophyllum (Williamsonia) pecten (Phillips).

(Plate 5, fig. 6.)

For full synonymy of *Williamsonia pecten*, *see* Seward (04), p. 190.

1883. *Ptilophyllum oligoneurum*, Tenison-Woods, Proc. Linn. Soc., N.S.W., 8, p. 149, t. 7, figs. 2-4.

1892. *Ptilophyllum oligoneurum*, Etheridge, Geol. Pal. Qld., p. 382, t. 7, fig. 11 ; t. 16, fig. 2.

1902. *Ptilophyllum oligoneuron*, Shirley, Qland. Geol. Surv., Bull. 18, p. 8.

---

[21] Seward (95), t. 10, fig. 5 ; t. 11, figs. 1, 2.

[22] Wieland (14), t. 27, fig. 6.

[23] Wieland (14), t. 27, fig. 7 ; t. 28.

[24] Feistmantel (76), t. 12, figs. 5-6.

The specimens which have been named *Ptilophyllum oligoneurum* are undoubtedly fronds of the *Williamsonia pecten* type, from which it is impossible to distinguish them.

In the Queensland examples the fronds are pinnate, long and narrow, gradually narrowing towards both base and apex; they attain a length of as much as 15 cm., and a breadth up to 2 cm. The pinnæ are closely set, attached to the rachis at a wide angle and are inserted on the upper surface; they have a pointed apex and the upper edge is somewhat auriculate near the base; they reach a length of a little over 1 cm. and are 1·5 to 2 mm. broad. The veins are slightly divergent and few in number, there being about 4 on each pinna.

Etheridge[25] questions whether Tenison-Woods was right in distinguishing this species from *P. acutifolium*, Morris, to which it had been referred by Kidston.

All the specimens from Queensland are of the small type of *Williamsonia pecten* frond figured by Seward from the Jurassic flora of Yorkshire.[26]

The majority of the specimens come from a single locality, and in the specimens collected there are no traces of *Williamsonia* flowers.

Locality :—(*Walloon Series*) : Stewart's Ck., Stanwell (F 73).

Figured specimen : The original of Plate 5, fig. 6, is specimen F 78 in the collection of the Queensland Geological Survey.

CYCADOPHYTA INCERTÆ SEDIS.

PTEROPHYLLUM.

The majority of the cycad remains from the Lower Mesozoic of Queensland seem to be referable to this genus. The separation of *Pterophyllum* and *Nilssonia* depends largely on the accurate determination of the manner of attachment of the pinnæ to the rachis, this being lateral in *Pterophyllum* and on the upper surface in *Nilssonia*. When viewed from the lower side the appearance of the genera is essentially the same, but their appearance on the upper side is quite different. It seems justifiable to be certain that the majority of the Australian forms here referred to are *Pterophyllum* since a comparatively large number of specimens is available, and it would hardly be expected that they could all be views of the

[25] Etheridge (92), p. 382.

[26] Seward (00), t. 3, fig. 5; text-fig. 34.

under surface. The determination as *Pterophyllum* is to some extent confirmed by the obtuse, broadly rounded terminations of the pinnæ, and the frequent dichotomous branching of the veins, both features being contrary to the usual habit in *Nilssonia*.

Pterophyllum abnorme, Etheridge Jr.

(Plate 5, figs. 1, 2, 3.)

1892. *Pterophyllum abnorme*, Etheridge Jr., Geol. Pal. Qld., p. 381, t. 17, fig. 5 and 6.

Frond linear, broad, long (the longest specimen available is incomplete and is 11 cm. in length). The rachis is well developed (up to 3 mm. broad), straight, and striated longitudinally. The pinnæ are at right angles to the rachis, alternate, subopposite or opposite, broad, parallel-sided, up to at least 3 cm. long and 5 to 8 mm. broad ; they are attached laterally by the whole base, a slight expansion at the base joining adjacent pinnæ ; the apex is bluntly rounded. The veins are fine, numerous, dichotomously branched at irregular intervals and about 20 in number in a single pinna.

The specimens referred to this species agree with Etheridge's type specimen of *P. abnorme*. An examination of the type specimen shows that the veins bifurcate at irregular distances from the rachis and not constantly at about half way as stated by Etheridge.

The present species is somewhat similar to *P. multilineatum*, Shirley, but is usually smaller, the frond is linear and narrower, and there are fewer veins.

Localities :—(*Walloon Series*) : Redbank, near Mt. Esk (F 153) ; Road between portions 155 and 157, Parish Biarra (1412).

Figured specimens : The originals of Plate 5, figs. 1 and 2, are specimens F 153 in the collection of the Queensland Geological Survey and 1412 in the University of Queensland Collection.

Pterophyllum contiguum, Schenk.

(Plate 6, figs. 3, 4.)

1903. *Pterophyllum contiguum*, Zeiller, Flore Fossile des Gîtes de Charbon du Tonkin, p. 191, t. 48, fig. 1-8.

1905. *Pterophyllum contiguum*, Fontaine, U.S.G.S., Monograph 48, p. 99, t. 19, fig. 7-11.

Frond linear, pinnæ becoming somewhat shorter towards base and apex, attaining a length of at least 11 cm., and probably considerably more. The rachis is strong, 1·5-2 mm. wide and striated longitudinally. The pinnæ are approximately at right angles to

the rachis, up to 2·3 cm. long and 3 to 4 mm. broad, parallel-sided, with the apex bluntly rounded ; they are attached laterally (?) by the whole base and are traversed by a small number of veins which divide dichotomously once near the rachis ; there are up to about 10 veins in a single pinna.

The specimens described here are similar in general form to *Pterophyllum contiguum*, Schenk, as figured by Fontaine,[27] and also to Zeiller's description of *P. contiguum*[28] from the Rhaetic of Tonkin.

Locality :—(*Walloon Series*) : Portion 28, Par. Biarra (F 159).

Figured specimen : The original of Plate 6, fig. 3, is specimen F 159 in the collection of the Queensland Geological Survey.

Pterophyllum multilineatum, Shirley.

(Plate 6, figs. 1, 2.)

1898. *Pterophyllum multilineatum*, Shirley, Proc. Roy. Soc. Qland., 12, p. 91, t. 7A.

1898. *Pterophyllum multilineatum*, Shirley, Qland. Geol. Surv., Bull. 7, p. 16, t. 22.

1898. *Pterophyllum yerongense*, Shirley, Proc. Roy. Soc. Qland., 12, p. 91, t. 7.

1898. *Pterophyllum yerongense*, Shirley, Qland. Geol. Surv., Bull. 7, p. 16.

1898. (?) *Pterophyllum quadrifilorum*, Shirley, *ibid.*, p. 16, t. 19, fig. 2 ; t. 24.

Frond broad, long, becoming narrower towards base and apex, the pinnæ being up to about 4 cm. long in the central part and 2 cm. at the lower end. The rachis is strong, being up to 3 mm. in breadth, and is finely striated. The pinnæ are at right angles to the rachis, alternate or subopposite, linear, up to 1 cm. wide, with bluntly rounded apices ; they are attached laterally by the whole base, adjacent pinnæ being joined by slight expansions. The veins are fine, parallel to the edge, dichotomous and numerous, there being about 18 at the base of the pinnæ and 30 to 36 near the outer end. The largest frond available is about 18 cm. long and when complete was probably more than 20 cm. in length.

The specimen named by Shirley[29] as *P. yerongense* is only a fragment showing the rachis and the basal portions of a few pinnæ, and there is little doubt of it being a portion of a large frond of

---

[27] In Ward (05), t. 19, fig. 7.

[28] Zeiller (03), p. 191.

[29] Shirley (98*b*), p. 91, t. 7.

P. multilineatum. The description of *P. yerongense* indicates 18 to 20 veins per pinna and this is the approximate number at the base in *P. multilineatum.*

The species *Pterophyllum quadrifilorum*, Shirley, is doubtfully included as a synonym of *P. multilineatum.* The originals of all the figures of *P. quadrifilorum* appear to have been lost. The only feature which distinguishes between these two species is the venation, and as no further specimens are available with the venation attributed to *P. quadrifilorum* it is probably better to regard this as a synonym of *P. multilineatum.*

Strictly speaking the name *P. yerongense* should be adopted for this species as it comes first of the two original descriptions, which are on the same page. It seems justifiable, however, in this case to adopt the name *P. multilineatum*, as both description and figure were more complete and also since specimens have been more widely recognised under this name.

Fragmentary specimens from Denmark Hill, Ipswich, have been collected with longer pinnæ (up to 5·5 c.m.) but probably these belong to larger fronds of the same species.

Similar species are of widespread occurrence, *e.g.*, *P.* sp., cf. *P. Tietzii*, Schenk, from the Burghersdorp Beds of South Africa,[30] *P. Tietzii* from the Rhætic of Persia and Tonkin and others.

This species has been recorded by Zeiller from the Rhætic of Tonkin.[31]

Localities :—(*Ipswich Series*) : Denmark Hill, Ipswich (F 161). Petrie's Quarry (F 160) ; Queensport (F 567) ; Yeronga (F 157).

Figured specimen : The original of Plate 6, fig. 1, is specimen F 161 in the collection of the Queensland Geological Survey.

Pterophyllum Nathorsti (Seward).

(Plate 5, figs. 4, 5.)

1900. *Dioonites Nathorsti*, Seward, Jurassic Flora, 1, p. 239.

1911. *Pterophyllum Nathorsti*, Seward, Proc. Roy. Soc. Edinb., 47, p. 694.

Some fragmentary specimens are referred to this species. They have long narrow pinnæ which are inclined to the rachis at an angle of about 60° ; the pinnæ are acutely pointed, have a width of 1 to 3 mm., and a length of 2·5 cm. They are attached by the whole base. The rachis has a width of from 1·5 to 2 mm. Each pinna is traversed by a small number (3 to 5) of simple, parallel veins.

---

[30] Seward (08), p. 103.

[31] Zeiller (03), p. 301.

The specimens may be best compared with some with coarser venation mentioned and figured by Seward from the Jurassic Flora of Sutherland.[32] A species which also bears a close resemblance to these specimens is *Ctenophyllum angustifolium*, Fontaine from the Jurassic Flora of Oregon.[33]

Locality :—(*Walloon Series*) : Portion 28, parish Biarra (1413).

Figured specimen : The original of Plate 5, fig. 4, is specimen 1413 in the University of Queensland Collection.

Pterophyllum parvum, Shirley.

The specimen on which Shirley[34] based this species is a very small fragment (less than 2·5 cm. long) and it is doubtful whether it represents a distinct species.

PSEUDOCTENIS.

The generic name *Pseudoctenis* was proposed by Seward [35] for fronds agreeing with *Ctenis* in general habit, but in which there is an absence of lateral anastomoses between the veins. The pinnæ are broadly linear and are attached laterally to the rachis as in *Pterophyllum*, the lower margin being decurrent and the upper curving slightly upwards as it joins the rachis.

Pseudoctenis eathiensis (Richards).

(Plate 7, figs. 1, 2.)

1884. *Zamites eathiensis*, Richards, Proc. R. Phys. Soc. Edinb., p. 117.

1892. *? Pterophyllum* sp. ind., Etheridge Jr., Geol. Pal. Qland., p. 382, t. 16, fig. 3.

1911. *Pseudoctenis eathiensis*, Seward, Trans. Roy. Soc. Edinb., 47, p. 692, t. 4, fig. 62, 62a, 67, 67a ; t. 7, photo. 11, 12 ; t. 8, photo. 32 ; t. 10, photo. 45.

The specimen figured on Plate 7, fig. 1, is so remarkably like that figured by Seward on Plate 10, photo. 45, of the Jurassic Flora of Sutherland[36] that little hesitation is felt in identifying the specimen with his species.

The rachis is about 7 mm. broad and wrinkled longitudinally. The pinnæ are at right angles to the rachis and are at least 6 cm. long, the specimen being incomplete, and are up to 1·1 cm. in width ; they contract slightly towards the base. The margins of the pinnæ

---

[32] Seward (11), p. 695, t. 5, fig. 86.
[33] Ward (05), p. 105, t. 32.
[34] Shirley (98), p. 15, t. 17, fig. 4.
[35] Seward (11), p. 691.
[36] Seward (11).

are entire, the lower margin being decurrent at the base. The attachment of the pinnæ is lateral. The veins are well-defined, branching dichotomously occasionally; there are about 17 veins per cm. of breadth.

The figures given by Seward of this species show a considerable amount of variation, particularly in the angle which the pinnæ make with the rachis. Another species which is of similar nature to those in which the pinnæ make an acute angle with the rachis is *P. Lanci*, Thomas, from the Jurassic Flora of the Marske Quarry, Yorkshire.[37]

The specimen described and figured by Etheridge as *Pterophyllum* sp. ind. from Colinton[38] very probably belongs to this species. It agrees in the broad rachis, insertion of pinnæ, and venation.

Other specimens have the pinnæ generally similar in form but making an angle of about 60° with the rachis. These are similar to figures of *P. eathiensis*[39] and may belong to the same species.

Locality :—(*Walloon Series*) : Colinton (F 154); Portion 28, Par. Biarra (1417); Coal Ck., near Esk (F 163); Portion 33, Parish Esk (F 158).

Figured specimen : The original of Plate 7, fig. 1, is specimen 1417 in the University of Queensland Collection.

Podozamites lanceolatus, L. and H.

Tenison-Woods[40] recorded and described this species from the Ipswich Basin. Etheridge[41] states, however, that the determination is open to doubt, and there are no specimens at present in the collection which can be referred to this species.

Podozamites sp.

Etheridge[42] described a specimen from Redbank as *Podozamites sp.* His figure and an examination of the original specimen indicate that the specimen is too imperfect even to be certain of a correct generic determination.

OTOZAMITES.

Specimens belonging to this genus are characterised by the manner of attachment of the pinnæ to the rachis, by a more or less distinct auriculation of the pinnæ at the base, and by the divergent venation. They occur fairly abundantly on horizons of the Walloon Series.

---

[37] Thomas (13), p. 242, t. 24, fig. 4; t. 26.
[38] Etheridge (92), p. 382, t. 16, fig. 3.
[39] Seward (11), t. 8, fig. 32.
[40] Tenison-Woods (83), p. 145.
[41] Etheridge (92), p. 380.
[42] Etheridge (92), p. 380, t. 18, fig. 5.

Otozamites queenslandi, n. sp.

(Plate 7, figs. 3, 4, 5.)

This species is abundant in the Esk district. The rachis is strong and about 2 mm. broad; the frond is rather linear, wide, open; the pinnæ make a varying angle with the rachis (usually 60° or more), and are alternate or subopposite, close together or somewhat distant; they narrow slightly towards the base and the apex is bluntly rounded. The attachment of the pinnæ to the rachis is on the upper surface and they seem to be slightly auriculate at the base, though this is difficult of determination. The pinnæ are from 1·1 to 2·8 cm. long, and 3 to 6 mm. wide. The veins are distinct, diverging, and branch dichotomously, there being usually about 7 or 8 veins at the base, and up to 22 at the widest part.

Of the specimens available, by far the greater number show the view from the lower side and, of course, in these cases the attachment of the pinnæ appears to be lateral as in *Pterophyllum*. A few specimens, however, show the upper surface, and it is seen that the pinnæ are really attached to the upper surface of the rachis. This method of attachment and the divergent character of the venation, together with the slight indication of an auriculate base seem to place the specimens undoubtedly in the genus *Otozamites*, and it appears to differ from any described species.

It is somewhat similar in general form with some specimens of *O. hespera*, Wieland, from the Liassic flora of the Mixteca Alta of Mexico.[43]

Locality :—(*Walloon Series*) : Road between portions 155 and 157, Parish Biarra (1416).

Figured specimens : The originals of Plate 7, figs. 3 and 5, are specimens 1410 and 1416 in the University of Queensland Collection.

Otozamites obtusus, L. and H.

(Plate 8, fig. 1.)

For fuller synonymy, *see* Seward (04), p. 39.

1834. *Otopteris obtusa*, Lindley and Hutton, Fossil Flora, t. 128.
1904. *Otozamites obtusus*, Seward, Jurassic Flora, vol. 2, p. 39, t. 1, figs. 1, 3, 5.

Frond pinnate, broad, linear (?), attaining a breadth of 5 cm. The pinnæ are slightly auriculate at the base and are inserted at a wide angle; they are up to nearly 3 cm. long and 4 to 5 mm.

[43] Wieland (14), t. 9, 10.

wide, attached by the central portion of the base to the upper surface of the rachis and have a broadly acute apex, somewhat truncated by the upturning of the lower margin. The rachis is about 2 mm. wide and is mostly hidden from above by the overlapping bases of the pinnæ. The veins are fine, divergent from the base, and repeatedly dichotomous; they average about 10 in the space of 5 mm.

The specimens described here from Beaudesert are so similar to some of Seward's figures of *O. obtusus*[44] that no hesitation is felt in identifying them with that species.

Locality :—(*Walloon Series*) : Beaudesert (F 150).

Figured specimen: The original of Plate 8, fig. 1, is specimen F 150 in the Collection of the Queensland Geological Survey.

Otozamites Feistmanteli, Zigno.

(Plate 8, figs. 2, 3.)

1881. *Otozamites Feistmanteli*, Zigno, Flora Foss. Oolit., vol. 2, p. 90, t. 34, f. 6-8.

1883. *Otozamites Mandeslohi*, Tenison-Woods, P.L.S.N.S.W., 8, p. 151.

1890. *Otozamites Mandelslohi*, Feistmantel, Mem. Geol. Surv., N.S.W., Pal. 3, p. 147, t. 28, f. 9, 9a.

1892. *Otozamites Mandeslohi*, Etheridge Jr., Geol. Pal. Qland., p. 381.

1900. *Otozamites Feistmanteli*, Seward, Jurassic Flora, 1, p. 221.

1910. *Otozamites Feistmanteli*, Arber, Geol. Surv., W.A., Bull. 36, p. 25.

Frond linear, more than 6 cm. long, 2 cm. wide. Pinnæ almost at right angles to the rachis, 1·2 cm. long, 4 mm. wide, overlapping, and attached to the upper surface. They are auriculate at the upper edge and have an obtusely-pointed apex. The veins are divergent and dichotomous, being about 6 or 8 in number at the base and up to 12 in the widest part.

From time to time Australian specimens have been referred to the species *Otozamites Mandelslohi*, Kurr. One of these specimens

[44] Seward (04), t. 1, figs. 3, 5.

was figured by Feistmantel.[45] It has, however, been suggested both by Seward[46] and Arber[47] that the specimens should perhaps more correctly be referred to *O. Feistmanteli*. Mr. W. S. Dun has been kind enough to send me tracings of Zigno's original figures of the latter species and comparison of these with Queensland specimens leaves no doubt of the identity of the two.

Localities :—(*Walloon Series*) : Near Thane's Creek, Warwick (F 339) ; Engelsburg-Boonah District (1420).

Figured specimen : The original of Plate 8, figs. 2 and 3, is specimen F 339 in the Collection of the Queensland Geological Survey.

Otozamites cf. Mandelslohi, Kurr.

(Plate 8, figs. 4, 5.)

Frond linear, narrow, with a breadth of about 1·5 cm. The pinnæ are rather orbicular, 8 to 9 mm. long and 7 mm. wide, with an obtusely rounded apex ; they overlap slightly and are auriculate at their upper margin. They are attached to the upper surface of the rachis. The veins are numerous, fine, divergent, and dichotomous, there being about 15 to 20 in a space of 5 mm.

The specimens described here differ from those which have been referred to *O. Feistmanteli*. The pinnæ are smaller and orbicular, and the venation is much finer than in the latter species. The only figures of *O. Mandelslohi* available to the author are those of Wieland[48] from the Liassic flora of the Mixteca Alta. Although the resemblance to these figures is not sufficient to indicate identity, it is sufficient to warrant a close comparison. The specimens previously referred to *O. Mandelslohi* by Tenison-Woods and Feistmantel have been identified with *O. Feistmanteli*, Zigno.[49]

Localities :—(*Walloon Series*) : Darling Downs, near Toowoomba (F 750).

Figured specimen : The original of Plate 8, fig. 4, is specimen F 750 in the collection of the Queensland Geological Survey.

---

[45] Feistmantel (90), t. 28, figs. 9, 9a.
[46] Seward (00), p. 221.
[47] Arber (10), p. 26.
[48] Wieland (14), t. 15.
[49] See above, p. 22.

CONIFERALES.

The coniferous remains from the Walloon Series are of a fragmentary nature and are not abundant. They include cones or portions of cones of *Araucarites* and fragments of branches and foliage leaves to which have been assigned generic names such as *Brachyphyllum, Taxites, Palissya,* and *Cunninghamites.* The value of these latter fragments is small botanically, but some of them have a certain value from a stratigraphical point of view. This is more particularly the case since they are mostly characteristic of the Walloon Series and do not appear in the Ipswich Series; the most valuable of the Lower Mesozoic fossils in Queensland are those which assist us in a palæontological distinction between the Ipswich and Walloon Series.

Araucarites polycarpa, Tenison-Woods.

(Plate 9, figs. 5, 6.)

1883. *Araucarites* (?) *polycarpa,* Tenison-Woods, Proc. Linn. Soc. N.S.W., 8, p. 165.

1883. *Araucarites* (?) *australis,* Tenison-Woods, *ibid,* t. 10, fig. 1.

1892. *Araucarites* (?) *polycarpa,* Etheridge, Geol. Pal. Qland., p. 383, t. 18, fig. 1.

The only specimens available are the cones which were described by Etheridge in 1892 and there is little that can be added to his remarks. He describes the specimen he figured thus: "The cone was probably elongate, and perhaps cylindrical; the scales are rhomboidal, with a subapical mucro, or stout blunt spine, but do not appear to be ridged in the true sense of the word, nor divided into an upper or lower portion; in each oblique row on the side visible there are about ten scales." [50]

These Araucarian cones all come from Stewart's Ck., in the Walloon Series, and there seems little doubt of their close relation to cones of *Araucaria.*

Localities :—(*Walloon Series*) : Stewart's Creek (F 709).

Figured specimen: The original of Plate 9, fig. 5, is specimen F 708 in the collection of the Queensland Geological Survey.

---

[50] Etheridge (92), p. 383.

Brachyphyllum crassum, Tenison-Woods.

(Plate 9, fig. 1.)

1883. *Brachyphyllum australe* var. *crassum*, Tenison-Woods, Proc. Linn. Soc., N.S.W., 8, p. 159, t. 5.

1892. *Brachyphyllum crassum*, Etheridge, Geol. Pal. Qland., p. 385, t. 18, fig. 2.

"Plant robust, thick; stem and branches repeatedly dichotomous; leaves thick and fleshy, densely crowded, homodromous, short, broad, obtuse, conspicuously keeled, erect, closely imbricate, but slightly spreading; branches and branchlets very little narrower than the parent stem, and of equal width to the summit; all portions of the plant curved, three leaves visible in each spiral, and about three rows in one centimetre. Length of leaves, from two to three millimetres; breadth, from five to six; diameter of cauline stem at widest part, ten millimetres; of branchlets, eight millimetres; length of shortest, eighteen millimetres." (Tenison-Woods.)

The Geological Survey Collections contain a few small specimens of this species, but as they are incomplete, the original description by Tenison-Woods, who had much larger and more complete specimens, is quoted.

The confusion regarding the naming of the specimens has been discussed by Etheridge.[51]

Localities:—(*Walloon Series*): Walloon (F 705); Clifton Colliery (F 711); Rosewood (near Ipswich) (F 753).

Figured specimen: The original of Plate 9, fig. 1, is specimen F 705 in the collection of the Queensland Geological Survey.

Taxites planus, Feistmantel.

(Plate 9, fig. 4.)

1879. *Taxites planus*, Feistmantel, Foss. Fl. Gondwana Sm., 1, pt. 4, t. 13-15.

1883. *? Taxites medius*, Tenison-Woods, P.L.S.N.S.W., 8, p. 160, t. 9, fig. 3.

1902. *Palissya gracilis*, Shirley, Qland Geol. Surv., Bull. 18, p. 8 t. 2.

A number of specimens from the Walloon Series at Stewart's Creek, Stanwell, have been referred to *Palissya gracilis* by Shirley.[52]

---

[51] Etheridge (92), p. 385.

[52] Shirley (02), p. 8, t. 2.

He remarks that they may be the same as Tenison-Woods' *Taxites medius*. The figure of the latter species[53] does not assist in the determination. Generic determinations of these specimens is not an easy matter, but the resemblance between these specimens and Feistmantel's figures of *Taxites planus*[54] is so very close that they are united with that species. Distinction between the genera *Taxites* and *Palissya* is not easy without very well-preserved specimens. It is not certain that *Taxites medius*, Tenison-Woods, is identical with *T. planus*.

The fronds of the Queensland specimens are up to 11 cm. long, with leaves 1·5 cm. long and ·75 mm. wide, traversed by a single median vein and with a rather acute tip.

The general appearance of the fronds suggests a difference in habit from the fronds of species of *Palissya* in the Jurassic of India.

Localities :—(*Walloon Series*) : Stewart's Creek, Stanwell (F 721) ; Stewart's Creek, Rockhampton (F 80) ; Road between Portions 155 and 157, Parish Biarra (1414).

Figured specimen : The original of Plate 9, fig. 4, is specimen F 721 in the collection of the Queensland Geological Survey.

GYMNOSPERMOUS SEEDS.

(Plate 8, figs. 6, 7, 8, 9.)

In the Ipswich Series at Denmark Hill, Ipswich, seeds of various types are very abundant and large collections have been obtained. It is not intended to publish here a detailed account but rather to indicate the different types briefly, leaving the results of a more detailed examination till a later date.

Some of these seeds have already been described and figured by Shirley as *Beania geminata* ;[55] Seward concludes, from the figures given by Shirley, that there is little or no evidence of generic identity with *Beania*.[56] An examination of the specimens shows, however, that some of them are very similar to *Beania* and may be generically identical. In that figured on Plate 8, fig. 9, there is a fairly stout axis bearing a few secondary axes at right angles, and these secondary axes bear at the distal end two oval seeds. These show a general resemblance to *Beania gracilis*, Carruthers.

---

[53] Tenison-Woods (83), p. 160, t. 9, fig. 3.
[54] Feistmantel (79), t. 13 ; t. 14, figs. 1, 2, 4, 5.
[55] Shirley (98), p. 16, t. 20.
[56] Seward (00), p. 42, 272.

Other examples resemble the female flowers of *Ginkgo* (*e.g.* Plate 8, figs. 6, 7). These have a stalk bearing two seeds somewhat similar to the two ovules of the female flower of *Ginkgo biloba*.[57] Specimens of the individual seeds show a scar at one end similar to that figured by the same authors.[58]

That many of these seeds had a thick, fleshy, outer coat is indicated by the wrinkled appearance of the surface in many cases.

Some examples (*e.g.* Plate 8, fig. 8) are similar to *Carpolithes* sp. A, described from the Jurassic rocks of Victoria.[59]

In none of these specimens is there any indication of any connection with foliage, so it is not possible to be certain of their exact relations.

Locality :—(*Ipswich Series*) : Denmark Hill, Ipswich.

Figured specimens : The originals of Plate 8, figs. 6, 7, 9, and 8, are specimens F 106, F 115, and F 103 in the collection of the Queensland Geological Survey, and S 69 in the "Simmonds" Collection in the University of Queensland respectively.

PLANTA INCERTAE SEDIS.

Phœnicopsis elongatus (Morris).

(Plate 9, figs. 2, 3.)

1845. *Zeugophyllites elongatus*, Morris in Strzelecki's New South Wales and Van Diemen's Land, p. 250, t. 6, figs. 5, 5a.

1903. *Phœnicopsis elongatus*, Seward, Ann. S. Af. Mus., 4, p. 67, t. 9, figs. 1, 9, 10.

Numerous examples of long narrow linear leaves from the Walloon Series in the Esk district may be compared with this species. These leaves attain a length of about 15 cm. (probably about 20 cm. when complete) and have a breadth up to 1·4 cm. ; they narrow gradually towards one end (which seems to be the basal end), where they are about 6 mm. wide. There is also a less gradual narrowing towards the apex from the widest part, the apex being bluntly acute. A number of veins are present and are about 1 mm. apart in the widest part. They are simple, not branching dichotomously.

[57] Seward and Gowan (00), t. 9, fig. 6.
[58] Seward and Gowan (00), t. 9, fig. 48.
[59] Seward (04*a*), p. 182, fig. 46.

These leaves are no doubt the same as those which have been recorded from time to time as *Zeugophyllites elongatus*. Their systematic position is a matter of uncertainty, and they have been compared with *Nœggerathiopsis*, a member of the Cordaitales and also by some authors with members of the Ginkgoales.

Locality :—(*Walloon Series*) : Road between Portions 155 and 157, Parish Biarra (1419).

Figured specimen : The original of Plate 9, fig. 2, is specimen 1419 in the Collection of the University of Queensland.

CONCLUSION.

In concluding the description of the flora of the Ipswich and Walloon Series it may be stated that a detailed discussion of the flora and a comparison with other floras is being prepared by the author. The results of this work so far obtained indicate that there are decided differences between the floras of the two Series, and that the flora of the Ipswich Series is of a distinctly older facies than that of the Walloon Series. It is also clear that the Walloon Series must be regarded as Jurassic, probably homotaxial with the Liassic or Lower Oolite of Europe ; while the Ipswich Series must be regarded as Triassic, perhaps homotaxial with the so-called Rhaetic Beds of various areas, but possibly older.

BIBLIOGRAPHY.

Arber, E. A. Newell (02). On the Clarke Collection of Fossil Plants from New South Wales. *Q.J.G.S.*, lviii, p. 1.

—— (10). Some Fossil Plants from Western Australia. *Geol. Survey W.A.*, Bull. 36, p. 25.

Chapman, F. (08). Report on Jurassic Plants. *Rec. Geol. Surv., Vic.*, vol. ii, part 4, p. 212.

Etheridge, R., Jr. (92). The Geology and Palæontology of Queensland and New Guinea. *Qld. Geol. Surv.*, Pub. 92.

Feistmantel, O. (76). The Jurassic (Oolitic) Flora of Kach. *Mem. Geol. Survey of India* (*Pal. Ind.*), Ser. 2, vol. ii, pt. 1.

—— (79). Upper Gondwana Flora of the Outliers on the Madras Coast. *Ibid.*, vol. 1, pt. 4.

—— (90). Geological and Palæontological Relations of the Coal and Plant-bearing Beds of Palæozoic and Mesozoic Age in Eastern Australia and Tasmania. *Mem. Geol. Surv., N.S.W.*, Pal. No. 3.

Fontaine, W. M. (83). Contributions to the Knowledge of the Older Mesozoic Flora of Virginia. *U.S.G.S.*, Monograph vi.

—— also Ward (05).

Knowlton, F. H. (14). The Jurassic Flora of Cape Lisburne. *U.S.G.S.*, Prof. Paper 85 D.

Renault, H. (85). Cours de Botanique Fossile, vol. iv. Paris.

Seward, A. C. (95). The Wealden Flora, part II. *Brit. Mus. Catalogue.*

—— (00). The Jurassic Flora, part I. *Brit. Mus. Catalogue.*

—— (00a). Notes on some Jurassic Plants in the Manchester Museum. *Mem. and Proc. Manchester Lit. and Phil. Soc.*, 44, No. 8.

—— (03). Fossil Floras of Cape Colony. *Ann. S. Af. Museum*, vol. iv, part i.

—— (04). The Jurassic Flora, Part II. *Brit. Mus. Catalogue.*

—— (04a). On a Collection of Jurassic Plants from Victoria. *Rec. Geol. Surv. Vic.*, vol. i, part 3, p. 155.

—— (08). Fossil plants from South Africa. *Q.J.G.S.*, lxiv, p. 83.

—— (11). The Jurassic Flora of Sutherland. *Trans. Roy. Soc. Edinburgh*, vol. 47, part 4, p. 643.

Seward, A. C., and Gowan, J. (00). The Maidenhair Tree (*Ginkgo biloba*). *Annals Botany*, xiv, p. 109.

Shirley, J. (98). Additions to the Fossil Flora of Queensland. *Qld. Geol. Surv.*, Bull. 7 (Pub. 128).

—— (98a). On *Baiera bidens*, Tenison-Woods. *Proc. Roy. Soc. Qld.* xii, p. 74.

—— (98b). Two new species of *Pterophyllum*. *Ibid.*, p. 89.

—— (02). Notes on Fossil Plants from Duaringa, Ipswich, Dawson R. and Stanwell. *Qld. Geol. Surv.*, Bull. 18 (Pub. 171).

Tenison-Woods, J. E. (83). On the Fossil Flora of the Coal Deposits of Australia. *Proc. Linn. Soc. N.S.W.*, viii, p. 37.

Thomas, H. H. (13). The Fossil Flora of the Cleveland District of Yorkshire : I. The Flora of the Marske Quarry. *Q.J.G.S.*, 69, p. 223.

Ward, L. F. (05). Status of the Mesozoic Floras of the United States. *U.S.G.S.*, Monograph 48.

Wieland, G. R. (14). La Flora Liasica de la Mixteca Alta. *Instituto geologico de Mexico*, Boletin 31.

Zeiller, R. (03). Flore Fossile des Gîtes de Charbon du Tonkin. *Etudes Gîtes Min. France*. Paris.

MINES DEPT.

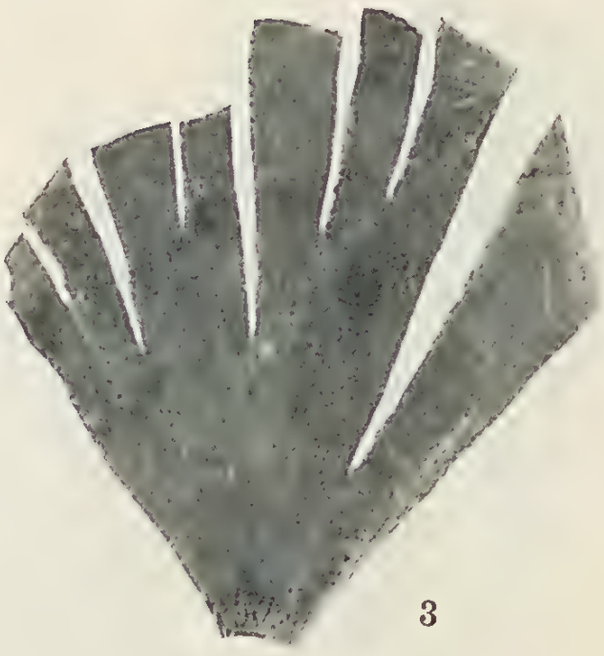
EXPLANATION OF PLATES.

Unless otherwise stated, the figures are approximately natural size.

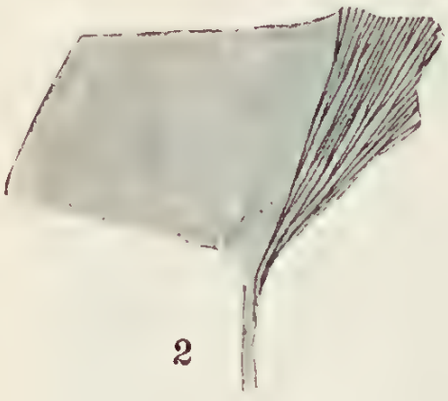
PLATE I.

1. *Ginkgo antarctica*, Saporta. Denmark Hill, Ipswich. *See* p. 7.
2. *Ginkgo antarctica*, Saporta. Diagram showing venation.
3. *Ginkgo digitata* (Brongniart). Railway Cutting, Oxley. *See* p. 8.
4. *Ginkgo digitata* (Brongniart). Campbell's Quarry, Albion. *See* p 8.
5. *Ginkgo digitata* (Brongniart). Diagram showing venation.

1

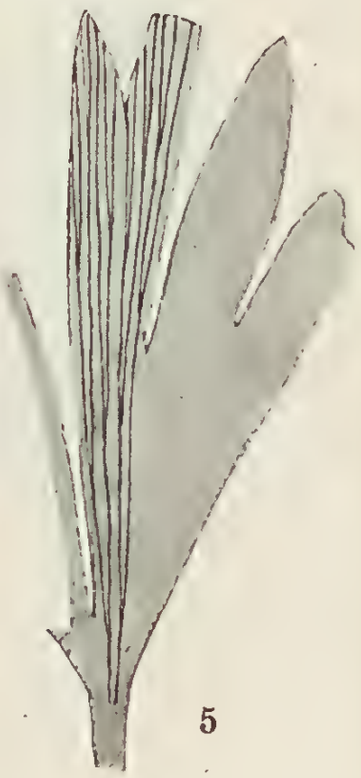


3



2

4



5

PLATE 2.

Baiera Simmondsi (Shirley). Denmark Hill, Ipswich. *See* p. 10

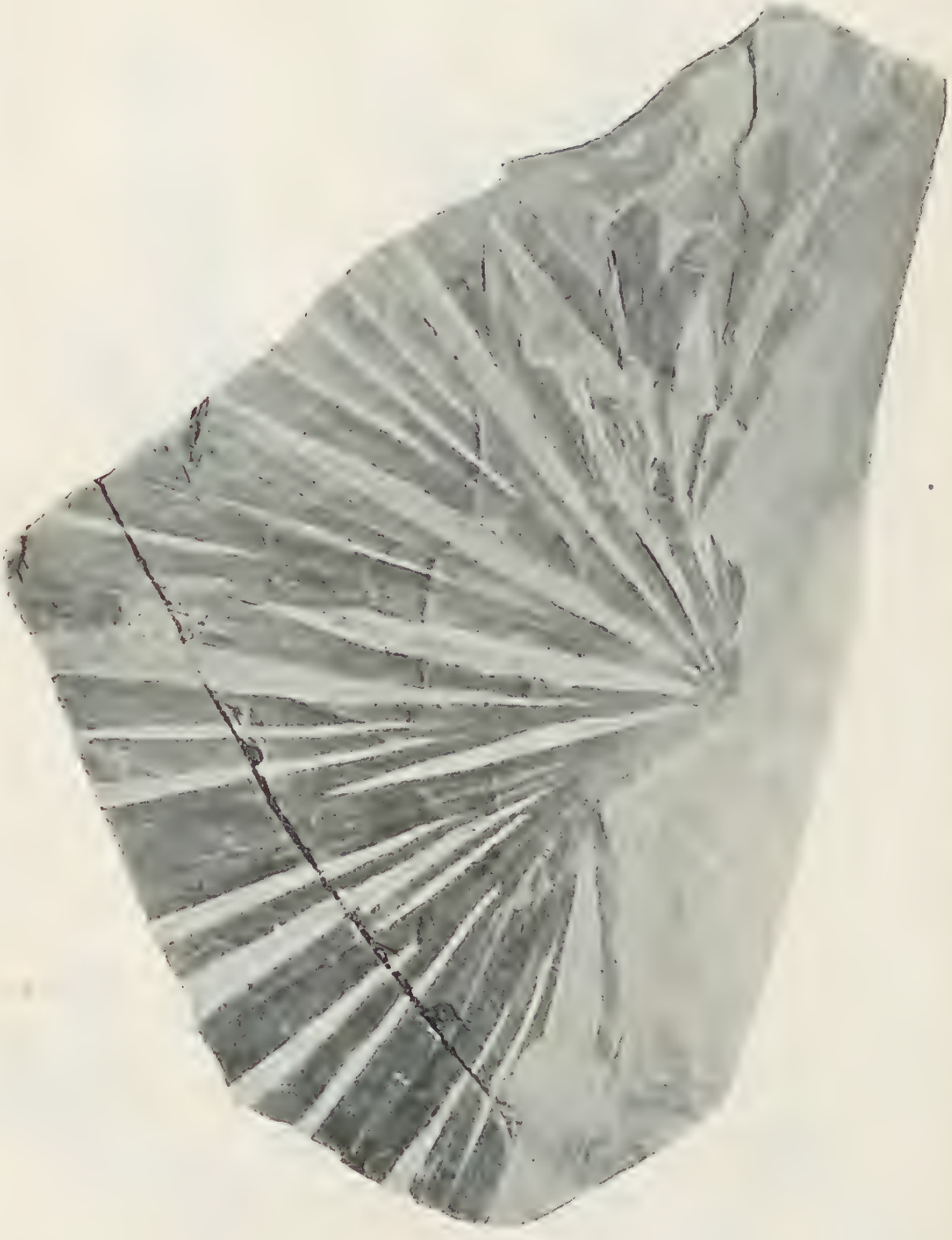


PLATE 3.

1. *Baiera bidens* (Tenison-Woods). Denmark Hill, Ipswich. *See* p. 11.
2. *Baiera bidens* (Tenison-Woods). Diagram showing venation.
3. *Baiera ginkgoides*, Shirley. Denmark Hill, Ipswich. *See* p. 12.
4. *Baiera ginkgoides*, Shirley. Diagram showing venation.

2

1

3

4

PLATE 4.

1. *Baiera ipsviciensis*, Shirley. Denmark Hill, Ipswich. *See* p. 11.

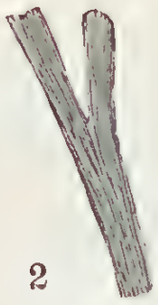
2. *Baiera ipsviciensis*, Shirley. Diagram showing venation.

3. *Ginkgo cf. magnifolia*, Fontaine. Road between Portions 155 and 157, Parish of Biarra. *See* p. 9.

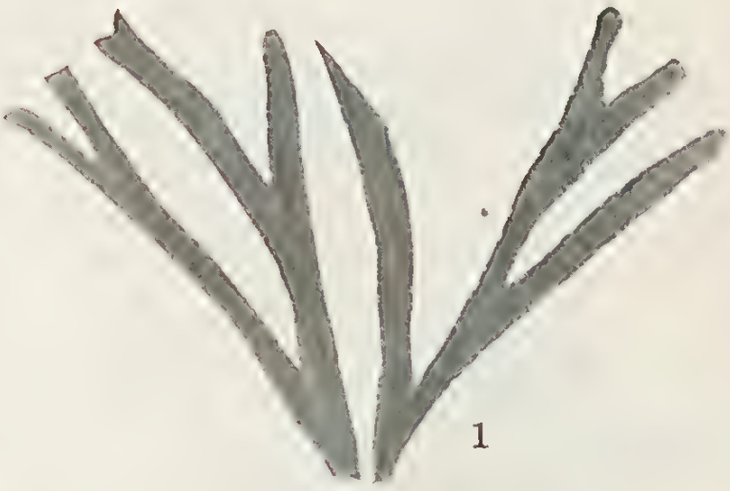
4. *Ginkgo cf. magnifolia*, Fontaine. Diagram showing venation.

5. *Bennettites (Williamsonia) sp.* Denmark Hill, Ipswich. *See* p. 14.

6. *Stachyopitys annularioides*, Shirley. Nundah. *See* p. 13.

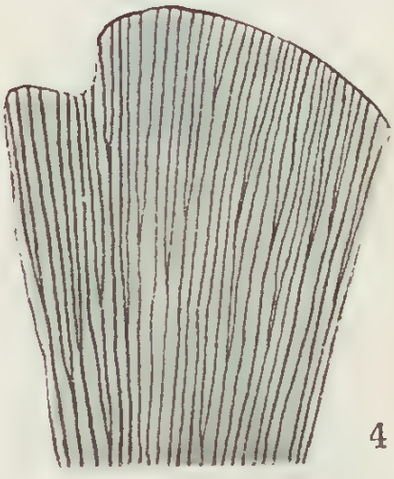


2



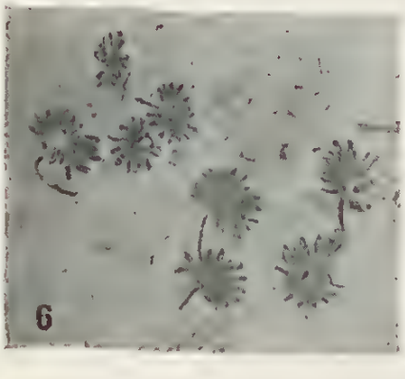
1

3



4

5



6

PLATE 5.

1. *Pterophyllum abnorme*, Etheridge Jr. Redbank, nr. Mt. Esk. *See* p. 16.

2. *Pterophyllum abnorme*, Etheridge Jr. Road between Portions 155 and 157, Parish Biarra. *See* p. 16.

3. *Pterophyllum abnorme*, Etheridge Jr. Diagram showing venation.

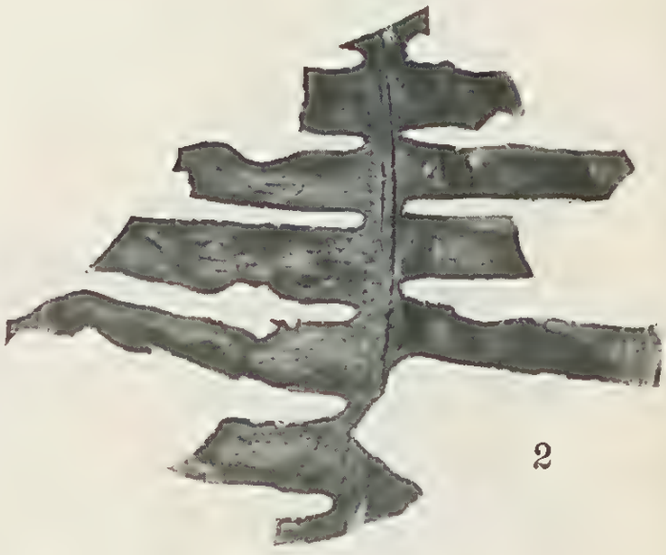
4. *Pterophyllum Nathorsti* (Seward). Portion 28, Parish Biarra. *See* p. 18.

5. *Pterophyllum Nathorsti* (Seward). Diagram showing venation.

6. *Ptilophyllum* (*Williamsonia*) *pecten* (Phillips). Stewart's Crk., Stanwell. *See* p. 14.

1

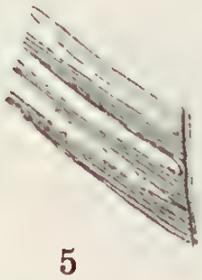
3



2

4

6

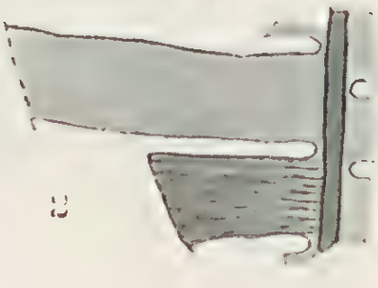


5

PLATE 6.

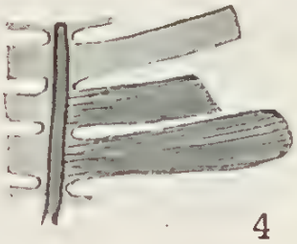
1. *Pterophyllum multilineatum*, Shirley. Denmark Hill, Ipswich. *See* p. 17.
2. *Pterophyllum multilineatum*, Shirley. Diagram showing venation.
3. *Pterophyllum contiguum*, Schenk. Portion 28, Parish Biarra. *See* p. 16.
4. *Pterophyllum contiguum*, Schenk. Diagram showing venation.

1



2

3



4

PLATE 7.

1. *Pseudoctenis eathiensis* (Richards). Portion 28, Parish Biarra. *See* p. 19.

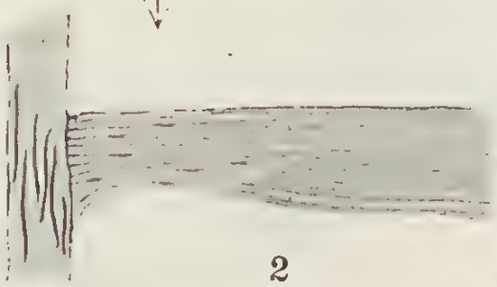
2. *Pseudoctenis eathiensis* (Richards). Diagram showing venation.

3. *Otozamites queenslandi, Walkom.* Road between Portions 155 and 157, Parish Biarra. *See* p. 21.

4. *Otozamites queenslandi,* Walkom. Diagram showing venation.

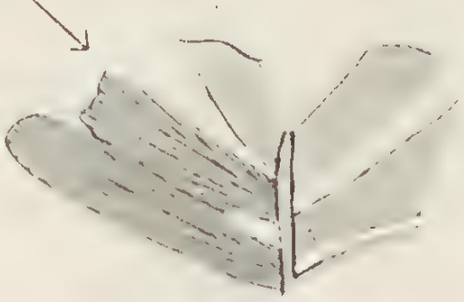
5. *Otozamites queenslandi,* Walkom. Road between Portions 155 and 157, Parish Biarra. *See* p. 21.

1



2

3



4

5

PLATE 8.

1. *Otozamites obtusus*, L. and H. Beaudesert. *See* p. 21.

2. *Otozamites Feistmanteli*, Zigno. Warwick. *See* p. 22.

3. *Otozamites Feistmanteli*, Zigno. Warwick. *See* p. 22.

4. *Otozamites cf. Mandelslohi*, Kurr. Darling Downs, nr. Toowoomba. *See* p. 23.

5. *Otozamites cf. Mandelslohi*, Kurr. Enlarged diagram showing venation. (× 4).

6. *Gymnospermous seed.* Denmark Hill, Ipswich. *See* p. 27.

7. *Gymnospermous seed.* Denmark Hill, Ipswich. *See* p. 27.

8. *Gymnospermous seed.* Denmark Hill, Ipswich. *See* p. 27.

9. *Gymnospermous seed.* Denmark Hill, Ipswich. *See* p. 26.

1

2

3

4

5

7

9

6

8

PLATE 9.

1. *Brachyphyllum crassum*, Tenison-Woods. Walloon. *See* p. 25.

2. *Phœnicopsis elongatus* (Morris). Road between Portions 155 and 157, Parish Biarra. *See* p. 27.

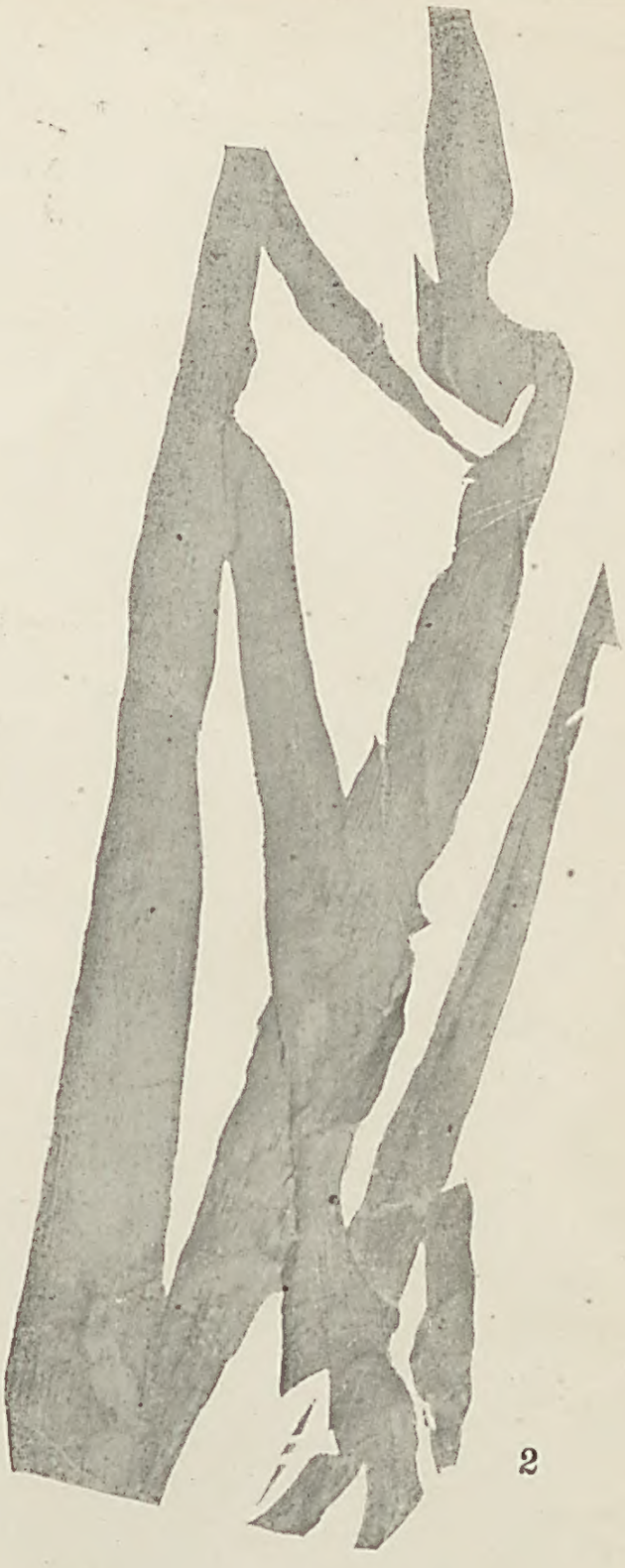
3. *Phœnicopsis elongatus* (Morris). Diagram showing venation.

4. *Taxites planus*, Feistmantel. Stewart's Crk., Stanwell. *See* p. 25.

5. *Araucarites polycarpa*, Tenison-Woods. Stewart's Creek, Rockhampton. *See* p. 24.

6. *Araucarites polycarpa*, Tenison-Woods. Part of Figure 5 enlarged. ($\times$ about 3).

1



2

3

4

5

6

Anthony James Cumming, Government Printer, Brisbane.